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William Rundell*, Department of Mathematics, Texas A&M University, College Station, TX 77843-3368, and **Bangti Jin**, Department of Computer Science, University College London, Gower Street, London, UK WC1E 6BT, United Kingdom. *A tail of two distributions; case studies for two classical inverse problems for fractional derivatives.*

Two classical inverse problems that exhibit extreme ill-conditioning are the backwards heat problem and the sideways heat problem. This talk looks at these when the heat operator is changed to one involving fractional derivatives. The results obtained are surprising and show that the physics involved gives rise to quite different outcomes. (Received January 19, 2015)